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Three New Aphid Parasites from the Pacific Coast. (Hymenoptera: Braconidae, Aphidiinae)

By C. F. W. MUESEBECK, U. S. National Museum

Recently I received a large collection of nicely preserved Aphidiinae for identification from Dr. Evert I. Schlinger, of the Citrus Experiment Station, Riverside, California. The specimens had been reared from various aphid hosts and included three new species, two of them in long series. All three are described here.

Aphidius (Protaphidius) ponderosae, new species

In Smith's key (1944, Contrib. Zool. Ent., Ohio State Univ., No. 6, p. 37) this species runs to *californicus* Ashmead. It differs conspicuously from that species, however, in being much larger, and in having the mesoscutum delicately sculptured and the metacarpus nearly as long as the stigma. In *californicus* the mesoscutum is smooth and polished and the metacarpus is only half as long as the stigma.

Female.—Length about 3.5 mm. Head strongly transverse and noticeably wider than the thorax; face more than three times as broad as long from antennal foramina to base of clypeus, usually with a little weak and indefinite roughening below antennae; malar space one-third as long as eye; temples strongly receding from the eyes; antennae with 20 to 22, usually 20, segments; ocellocular line about three times as long as diameter of an ocellus.

Mesoscutum very delicately coriaceous and subopaque; notaulices weak but usually distinct; scutellum smooth and pol-

ished; propodeum largely smooth but usually with a little weak, indefinite sculpture; a median longitudinal carina on dorsal face of propodeum, and from its caudal end a transverse carina extending each side to the spiracle; longitudinal carinae on posterior declivity of propodeum wanting, and the areola, therefore, incomplete; pleura smooth and polished. Stigma hardly twice as long as broad; metacarpus nearly as long as stigma; stub of second abscissa of radius not, or barely, longer than intercubitus.

Abdominal petiole weakly rugulose, except basally and just before apical margin where it is smooth; remainder of abdomen smooth.

Male.—Essentially like the female, but antennae with 21 to 23, usually 22, segments.

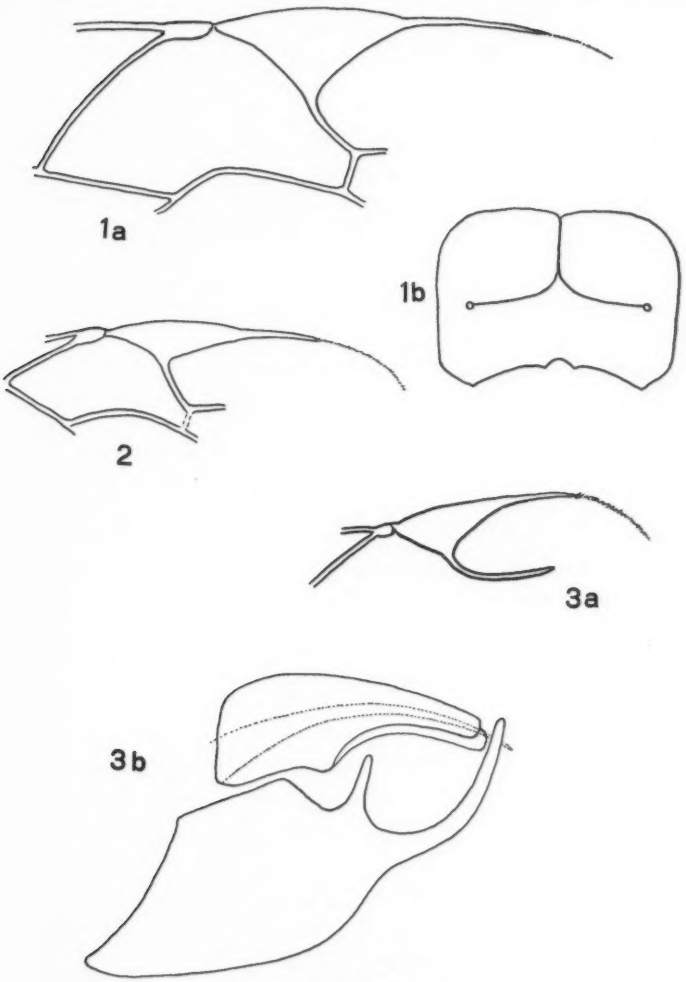
Type.—U. S. National Museum No. 64229.

Type-locality.—Cold Spring Camp, Allison Pass, Hozameen Mts., in E. C. Manning Provincial Park, New Westminster Sector, BRITISH COLUMBIA, elev. 4,450 ft.

Described from 21 females, including holotype, and 11 males reared from *Cinara* sp. on *Pinus ponderosa* by Evert I. Schlinger, June 4, 1957.

Aphidius (Aphidius) alius, new species

This is apparently very similar to *confusus* Ashmead, where it will run in Smith's key (1944, Contrib. Zool. Ent., Ohio State Univ., No. 6, p. 51). Unfortunately, the holotype and only known specimen of *confusus* is headless, and a thoroughly satisfactory comparison is, therefore, impossible; but the present species differs from that incomplete type specimen in having all coxae yellow and the abdomen behind the petiole piceous to black; in the type of *confusus* the hind coxae are black and the abdomen is almost entirely testaceous. In addition, the new species has the metacarpus considerably shorter in relation to the length of the stigma than it is in *confusus*. From *nigriteleus* Smith, which it also closely resembles, it may be distinguished by its much shorter metacarpus, which is not longer than the



EXPLANATION OF FIGURES

1, *Aphidius* (*Protaphidius*) *ponderosae*, n. sp.: a, part of forewing; b, propodeum. 2, *Aphidius* (*A.*) *alius*, n. sp., part of forewing. 3, *Trioxys* (*Acanthocaudus*) *schlingeri*, n. sp.: a, part of forewing; b, ovipositor sheath and last sternite.

first abscissa of radius, by its smoother abdominal petiole, by its black prothorax, and by the female antennae being blackish throughout.

Female.—Length about 2.3 mm. Head smooth and shiny; eyes large and prominent, converging below; malar space shorter than clypeus; temples somewhat convex but receding rather strongly; antennae with 15 or 16 segments (15 in two, 16 in three, of type series), all flagellar segments at least twice as long as broad.

Thorax smooth and polished; propodeum with a median longitudinal carina extending from base to middle and behind this a narrow, subpentagonal areola, costulae well developed; metacarpus and first abscissa of radius subequal; stub of second abscissa of radius slightly longer than intercubitus, which is very weak.

Abdomen smooth and shiny except for a little faint sculpture on basal half of petiole.

Black; clypeus yellow or brownish yellow; face sometimes more or less brownish; propodeum occasionally ferruginous; wings hyaline; all coxae and trochanters yellow, although the hind coxae may be a little darkened at bases; all femora, tibiae and tarsi usually a little infuscated.

Male.—Antennae 18-segmented in the two males of the type series. Otherwise like the female.

Type.—U. S. National Museum No. 64230.

Type-locality.—Riverside, CALIFORNIA.

Described from five females and two males reared April 16, 1957, from *Macrosiphum rosae* (L.) on *Rosa* sp. by Evert I. Schlinger.

Trioxys (Acanthocaudus) schlingeri, new species

This is the third Nearctic species of the subgenus *Acanthocaudus*. It closely resembles *tissoti* Smith, but it lacks the distinct, median longitudinal carina on the basal half of propodeum which distinguishes that species; and the eyes are more definitely convergent below.

Female.—Length about 2.2 mm. Head smooth and polished; malar space about as long as median length of clypeus; face noticeably narrower at base of clypeus than at antennal foramina; temples convex, not receding from the eyes; antennae 12-segmented, the first flagellar segment slightly the longest, the apical segment usually a little the shortest, the remainder subequal.

Thorax smooth and polished except for a little vague sculpture on posterior declivity of propodeum; propodeal areola not distinctly defined.

Abdomen, including petiole, smooth and polished; the last three tergites each with a row of short, stout spines along the caudal margin; spiracles of petiole prominent, at or slightly behind middle; ovipositor sheath and posterior prongs as illustrated.

Head and thorax black; clypeus, pleura and propodeum often more or less brownish or piceous; antennae piceous to black; wings hyaline; legs piceous. Abdomen brownish yellow on petiole and apical segments; middle segments piceous.

Male.—Like the female in essential characters, except that the antennae are 13-segmented.

Type.—U. S. National Museum No. 64231.

Type-locality.—Skihist Camp, 5 miles east of Lytton, British Columbia, elev. 580 ft.

Described from the female holotype and many paratypes of both sexes reared at the type locality June 2, 1957, from *Macrosiphum ambrosiae* (Thomas) by Evert I. Schlinger. I take pleasure in naming this species for Dr. Schlinger, who reared all three species described in this paper.

Increase in Subscription Rates for 1959

The cost of printing and distributing ENTOMOLOGICAL NEWS has been increasing greatly in recent years. Only the steady growth of our subscription list, and the additional income from the sale of runs of back volumes during these years has made it possible to keep the subscription rate at the same figure for the past six years. Now, however, some additional income will have to be secured.

Beginning January 1959 (Vol. 70) the subscription rate to libraries, laboratories, and institutions of every sort will be $6.00 per annual volume ($6.30 foreign, $6.15 Canada).

Private subscriptions for personal, individual use will remain at the same rate as heretofore, i.e., at $5.00 ($5.30 foreign, $5.15 Canada).

By this arrangement, there will be no decrease in individual subscriptions of the many amateur and professional entomologists who read the NEWS, and, it is hoped that many younger enthusiasts, especially students, will be encouraged to subscribe. By thus maintaining a large circulation, even if in part at a reduced rate, the costs will be more broadly spread to the ultimate benefit of institutional as well as individual subscribers.

Some Previously Undescribed Males and New Sex Associations in the Pompilinae (Hymenoptera: Pompilidae)

By HOWARD E. EVANS, Cornell University, Ithaca, N. Y.

Although the classification of the Nearctic Pompilidae has undergone many refinements in the past fifteen years, there remain a number of species known from only one sex. The purpose of the present paper is to describe the previously unknown males of *Pompilus perfasciatus* Evans and *Aporus bequaerti* (Banks) and to place in synonymy a species previously known from only the male sex, *Psorthaspis albocaudata* (Malloch). Knowledge of the male of *Aporus bequaerti* raises certain questions regarding generic limits in the Aporini; these are discussed at the end of the descriptive material.

Pompilus (Perissopompilus) perfasciatus Evans

Pompilus (*Perissopompilus*) *perfasciatus* Evans, 1951, Trans. Amer. Ent. Soc. 77: 225–226; Evans, 1953, Ann. Ent. Soc. Amer., 46: 531.

This species has been known from only two females, both from Riverside Co., Calif. On April 18, 1957, Dr. R. M. Bohart, of the University of California at Davis, took a series of three females and two males in dunes in Borrego Valley, San Diego Co., Calif. Interestingly enough, Dr. Bohart took four females and thirteen males of *P.* (*P.*) *phoenix* Evans, the only other known species of this subgenus, at the same time and place.

The male *perfasciatus* is readily separable from that of *phoenix* by virtue of the complete coalescence of the second and third transverse cubital veins, leaving only two submarginal cells; in addition, the apical fuscous band of the fore wing is smaller and the body pubescence much coarser. The terminalia agree in general pattern with those of *phoenix*, but there are some notable specific differences.

Description.—Length 3.5–4.5 mm.; fore wing 2.5–3.5 mm. Black; wings hyaline and with a whitish bloom, a brown band occupying the apical .2 of the fore wing; this band barely reaches

the tip of the marginal cell and posteriorly fades out before reaching the subdiscoidal vein. Entire body clothed with a coarse silvery pubescence, including the scape and the legs to the femora; pubescence especially prominent on the temples, posterior margin of pronotum, mesopleura, sides of the propodeum, and the hind coxae; pubescence on abdominal tergites directed backward except in broad apical bands, where it tends to diverge from the median line.

Head broad, the transfacial distance about 1.2 times the facial distance. Antennae relatively short, the first four segments in a ratio of about 10:4:4:5, segment three no longer than thick. Ocelli small, in a large triangle, the postocellar line greater than the ocello-ocular line as 8:5. Posterior margin of pronotum arcuate. Legs weakly spinose, the middle tibiae, however, with several fairly strong spines. Fore wing with the marginal cell slightly more than twice as broad as high, removed from the wing-tip by about 1.5 times its own length; second submarginal cell 1.5–1.7 times as broad as high; third submarginal cell absent; second submarginal cell receiving the second recurrent vein at or just basad of its outer apical corner.

Abdomen slender and with a strong tendency for the apical segments to telescope within the basal three segments. Sixth sternite with a broad, rectangular emargination which is flanked by a pair of thick, two-pronged spines; disc of this sternite with a pair of weak lateral carinae, but without the distinctly marked off median area of *phoenix*. Subgenital plate (fig. 2) shaped much as in *phoenix* but without the basal lateral expansions of that species. Genitalia (fig. 1) very similar to those of *phoenix* but differing as follows: parameres somewhat thicker and with a prominent squama about one-third the distance from the apex; parapenial lobes with a series of weak serrations along their inner margin; aedoeagus with the apex only weakly expanded.

Psorthaspis planata (Fox)

Planiceps planatus Fox, 1892, Ent. News 3: 171. ♀.
Pedinaspis albocaudata Malloch, 1928, Proc. Ent. Soc. Wash. 30: 101. ♂. NEW SYNONYMY.

Malloch's *albocaudata* has remained in limbo since its description. Bradley (1944, Trans. Amer. Ent. Soc. 70: 152), on the advice of Banks, assigned the species to *Allocyphonyx*. I removed it to *Psorthaspis* (1954, Amer. Mus. Novitates no. 1662, p. 15), but was unable to place it properly because of the fact that the tips of all the tarsi are absent in the type and only known specimen.

The collections of the California Insect Survey contain a number of male specimens of *planata* from Borrego, San Diego Co., Calif., in which the apical abdominal tergites bear whitish pubescence. In some specimens the white is very limited, in others it covers all of the tergites beyond the third. This suggested to me that the type of *albocaudata* (from Higley, Ariz., U. S. Nat. Mus. no. 27432) might be merely a "white-tailed" *planata*. Re-examination of the type reveals that it is indeed *planata*, with the characteristic elevation of the ocellar triangle and other features of this species. The white pubescence begins on the posterior part of the third tergite, so it is somewhat more extensive than in any specimen from Borrego. *P. planata* is apparently rare in Arizona; I have seen a few females but no males other than this one. Whether all males from Borrego eastward are "white-tailed" and whether the name *albocaudata* should be retained in a subspecific sense remain to be determined.

Aporus (Aporus) bequaerti (Banks)

Planiceps bequaerti Banks, 1931, Bull. Brooklyn Ent. Soc. 26: 131. ♀.

Aporus (Aporus) bequaerti Bradley, 1944, Trans. Amer. Ent. Soc. 70: 95. ♀.

This species has been known from only a few females from eastern Mexico and southern Texas. For several years I have been aware of the occurrence of an unknown male *Aporus* in this area. On June 24, 1956, I collected three specimens of this unknown male on the flowers of *Avicennia nitida* near Port Isabel, Cameron Co., Texas, in close association with two female *bequaerti*. I think there can be little doubt that it represents the male of *bequaerti*.

These males run directly to *calcaratus* (Fox) in Bradley's key to the species of *Aporus* (1944, Trans. Amer. Ent. Soc. 70: 89). I have recently examined the type and only known specimen of *calcaratus* in the Academy of Natural Sciences of Philadelphia ("S. Fla., Robertson," type no. 4721). The two species are actually very different and may be separated as follows:

Second recurrent vein reaching the cubitus well apicad of the second transverse cubital vein; propodeum nearly flat in front, with a short, steep declivity behind; length 6.5–14 mm..... .....*bequaerti* (Banks)

Second recurrent vein reaching the cubitus at the same point as the second transverse cubital vein (in the left wing of the type, apicad of it by half the width of the vein); slope of propodeum low and even; length 5.5 mm.....*calcaratus* (Fox)

Description.—Length 6.5–14 mm.; fore wing 5.5–10.5 mm. Black, the tibial spurs white and the apical abdominal tergite with a white spot; body very extensively clothed with a fine silvery pubescence, more coarse and suberect on the posterior part of the propodeum; wings hyaline, the apical margin of the fore wing narrowly infuscated.

Clypeus slightly less than twice as broad as high, its apical margin weakly convex. Front relatively narrow, the middle interocular line .63 times the transfacial line. Ocelli in a broad triangle, postocellar line greater than ocello-ocular line as 7:5. First four antennal segments in a ratio of about 8:2:8:9, segment three slightly less than twice as long as thick. Pronotum long, its posterior margin arcuate but with a small median angulate notch. Propodeum rather long, its median line weakly impressed, its posterior declivity short and steep. Legs slender, the tibiae and tarsi with many small black spines; longer spur of hind tibia .62 times the length of the hind basitarsus. Wings with the transverse median and basal veins interstitial or nearly so; marginal cell acute apically, removed from the wing-tip by considerably less than its own length; second submarginal cell about twice as broad as high; second recurrent vein meeting the cubitus beyond the second transverse cubital vein by about half the length of the latter vein.

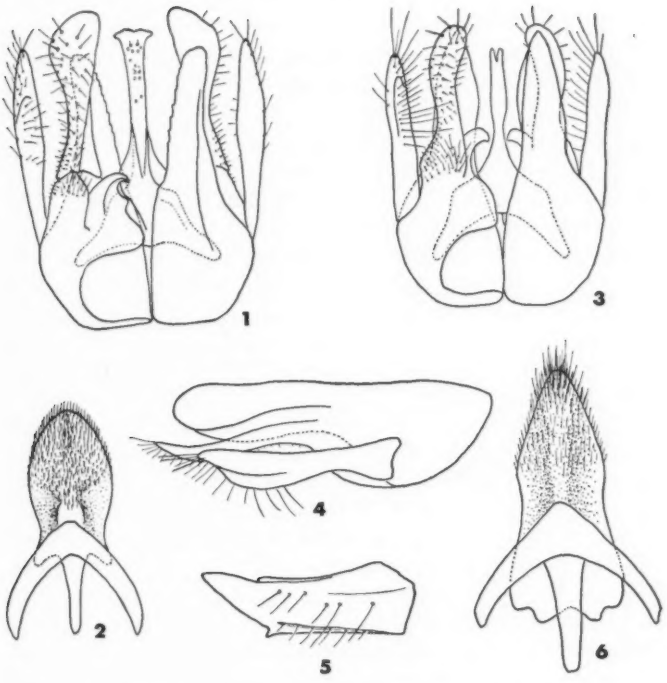


FIG. 1. *Pompilus* (*Perissopompilus*) *perfasciatus* Evans, male genitalia, ventral aspect on the left side, dorsal on the right. FIG. 2. Same species, subgenital plate. FIG. 3. *Aporus* (*Aporus*) *bequaerti* (Banks), male genitalia, ventral aspect on left side, dorsal on right. FIG. 4. Same species, male genitalia in lateral aspect. FIG. 5. Same species, mandible of female. FIG. 6. Same species, subgenital plate of male.

Abdomen with scattered erect setae on the apical segments ventrally. Emargination of sternite 6 deep, U-shaped. Subgenital plate (fig. 6) with a median longitudinal elevation, tapering to a subacute apex. Genitalia (figs. 3, 4) with the parameres short, obliquely truncate apically; volsellar digiti simple, with short hairs which are evenly distributed; aedoeagus short and slender.

Remarks on Generic Limits in the Aporini

As I indicated above, the male *bequaerti* runs to *calcaratus* in Bradley's key to the species of *Aporus*. But the fact is that neither of these species will run to *Aporus* in his generic keys. Either these species do not belong in *Aporus* or some modification of our interpretation of this genus is necessary.

In the case of *calcaratus* (Fox), the venational features mentioned above would seem to place it in *Aspidaporus* Bradley, known only from Brazil. I have compared the type of *calcaratus* with a paratype of *Aspidaporus minusculus* Bradley. The two specimens are so similar they might almost be conspecific. However, since the male genitalia of *calcaratus* have never been studied and the female is unknown, no accurate generic assignment of this species can be made at this time. Presumably the female will be found to possess the unusual antennal fossae and the margined pronotal disc of *Aspidaporus*. If it does not, then additional characters for the separation of the males of these genera must be sought.

On the other hand, the male *bequaerti* (Banks) runs in Bradley's key to *Odontaporus* Bradley, since the parameres are straight and do not reach the apex of the parapenial lobes. (Actually the parameres are somewhat intermediate in form between *Aporus* and *Odontaporus*.) This fact has led me to re-examine the mandibles of the female *bequaerti*, and I find that they possess a tooth on the lower margin (fig. 5). Although this tooth is not as large as in the species which Bradley assigned to *Odontaporus*, it is nevertheless distinct in all of the specimens I have seen. As a matter of fact, some evidence of such a tooth is visible in freshly emerged specimens of *Aporus niger* (Cresson). Although Bradley supported his separation of *Aporus* and *Odontaporus* with color characters, he himself recognized certain exceptions to these color differences. In my opinion the species placed by Bradley in *Odontaporus* represent an early invasion of one or more stocks of *Aporus* (*s. str.*) into Central America and the Antilles, where these forms became isolated and specialized with respect to color, mandibular structure, and genitalia. As a subgenus, *Odontaporus* seems to me

considerably weaker than Bradley's subgenera *Notoplaniceps* and *Neoplaniceps*. In my opinion *Odontaporus* Bradley, along with *Melanaporus* Ashmead, which is an earlier name for the same group, should be placed in the synonymy of *Aporus*, subgenus *Aporus*.

A New Schendylid from the Eastern United States, with Notes on Distribution and Morphology. (Chilopoda: Geophilomorpha: Schendylidae)

By Ralph E. Crabill, Jr., Smithsonian Institution, Washington, D. C.

The chilopod fauna of the central and southern Appalachians, including parts of the adjacent Cumberland Plateau, seems to be comprised of several rather distinct components. Apart from recent artificial introductions and endemic elements of uncertain geographical affinity, two fairly heterogeneous factions stand out, groups having an affinity with eastern Asia and, or, northwestern America, and those with an affinity with the southwestern United States, and, or, lands to the south, principally Mexico.

The implication is that this area in the southeastern United States today shows the influence of earlier faunal movements, on the one hand, from the south, and on the other, from the American northwest, and ultimately from Asia.

Examples of the northwestern and Asian contribution are found in the following: *Strigamia, Arctogeophilus, Geophilus, Escaryus, Scolopocryptops* (except *gracilis*), *Zygethobius, Zygethopolys, Bothropolys,* and perhaps the majority of the Lithobiidae (*sens. str.*). A southern derivation is suspected for some of the species of: *Gosiphilus, Arenophilus, Nyctunguis, Scolopocryptops* (*gracilis*), *Scolopendra* (*viridis* and *polymorpha*), *Theatops, Cryptops,* all of the Gosibiidae and Watobiidae, a few Lithobiidae such as *Neolithobius* and *Enarthrobius,* and some Henicopidae, notably *Lamyctes* and *Buethobius.* I do not mean to imply that a given group arose, was evolved, in either region —although some must have been—but merely that both regions

independently and probably at different times contributed to the existing centipede fauna of the lower Appalachians and adjacent areas.

To the southern component belongs the present new species, *Nyctunguis pholeter,* whose known congeners are especially characteristic of the North American southwest and Mexico. Apart from this rich fauna, two other species are known, one from the Leeward Islands, and another, rather aberrant form from Turkey.

The presence of *Nyctunguis* in the southern Appalachians suggests an ancient dispersal from the south, possibly from Mexico, and perhaps parallels the case of the himantariid *Gosiphilus euphorion* Crabill, whose closest relatives flourish on the Pacific coast south to Mexico. A third species linking the Cumberland Plateau with the far west is *Zygethopolys atrox* Crabill whose affinities, by contrast, are with the Pacific northwest, Alaska, and Asia.

On the basis of the original description, the Californian *Nyctunguis glendorus* Chamberlin seems most like *pholeter.* Possibly the most important distinctions between the two are: *glendorus,* median labral arc short, about $\frac{1}{3}$ of the labral width, *pholeter,* median arc wider, about $\frac{1}{2}$ the labral width; *glendorus,* dentate lamella in three blocks each with three teeth, *pholeter,* dentate lamella very vaguely divided into two blocks, with two and eight teeth respectively.

Nyctunguis pholeter, new species

Type: ♀; Tennessee, DeKalb County, Cripps' Mill, Cripps' Mill Cave; December 27, 1956; Thomas C. Barr, leg. Deposited in the U. S. National Museum; Myriapoda Type Number 2453.

TOTAL LENGTH: 31 mm. ANTENNAE: Yellow, essentially concolorous with head. The right, normal, 3.5 mm long; proximal 4 articles notably less setose than those remaining. Left, abortive, consisting of 7 abnormally long articles. CEPHALIC PLATE: Yellow; 1.03 mm. long, greatest width 0.83 mm.

Anteriorly rounded, narrowing very slightly posteriorly, sides slightly bowed outward; posterior corners narrowly rounded; posterior margin straight, concealing the prebasal plate. Reticulation moderately strong; vestiture sparse; frontal suture absent. CLYPEUS: (fig. 1). Reticulation pronounced, the majority of the figures essentially pentagonal; clypeal area absent. Postantennal setae 2; prelabral setae 2, minute (fig. 8); remaining setae disposed in two irregular, subparallel rows as shown. LABRUM: (fig. 8). Medial arc relatively wide, its tuberculate teeth (fig. 11, A) numbering 16, these directly meeting adjacent clypeus. Each lateral (i.e., side) piece weakly sclerotized, weakly reticulate antero-medially as shown (fig. 8, D); each indistinctly separated from clypeus proper by an extremely thin strip free of reticulation; lateral teeth numbering 6 and 7 (fig. 8, B), their apices sharply pointed and directed medially. MANDIBLE: (fig. 13). The dentate lamella very inconspicuously divided into two blocks (suppl. note 1), the lower of these with 2, the upper with 8 blunt teeth (fig. 13, B). FIRST MAXILLAE: (figs. 4, 7). Non-membranous portions prominently reticulate; coxosternum medially without a suture or weakened area, with a pair of long setae on each side of middle; each telopodite with a broad colorless and partially-concealed lappet (fig. 4, A) and each antero-lateral angle with a small, totally-concealed lappet (fig. 4, B) (see suppl. note 2). SECOND MAXILLAE: (fig. 7). Claw (fig. 3) rather broad, robust; its dorsal and ventral edges each with a row of delicate hyaline teeth or fimbriae, each of these drawn out into a long, thin point. Bridge-piece broad, strongly reticulate. PREHENSORS: (figs. 5, 6). Concolorous with prosternum and cephalic plate. When closed, slightly surpassing front margin of head. Sparsely setose, the articles totally without denticles. Claw (ungula) robust, rather short, its posterior edge not serrate or crenulate; poison gland and calyx as shown (figs. 5, 6) (suppl. note 3). PROSTERNUM: (fig. 2). Medial diastema conspicuous, margined on each side by a strong, sclerotized, deeply-pigmented ridge posterior to which is a small field of strong reticulation (fig. 2, A). Chitinlines absent, but each lateral suture (i.e., coxopleural or pro-

sternopleural suture) margined for part of its length by a slight ridge or thickening (fig. 2, B).

STERNITES: (fig. 14). Weakly-defined, non-consolidated and reticulate paxilli (fig. 14, A) on sternites 2 or 3 through 14. Prominent medial, undivided pore-fields (fig. 14, C) on sternites 2 through 22. Very obscure, bilateral pore-fields (fig. 14, B), each consisting of a few scattered and minute pores, present on sternites 1 through the penultimate, there represented by 2 or 3 pores on each side. LEGS: 51 pairs. Each pretarsus with a pair of relatively prominent lateral non-articulated bristles (spines), these long, pointed, extremely thin (fig. 9) (suppl. note 4). ULTIMATE PEDAL SEGMENT: (fig. 10). Sternite broad, sides converging slightly toward truncate posterior edge. Coxopleural pores of the homogenous type (i.e., without inclusive canals and multiple discrete glands); each elongate, partly concealed by the sternite. Left leg (excluding coxopleuron) 1.27 mm. long, 1.3 × the length of penultimate leg, each ultimate pretarsal claw strong, curved, deeply pigmented; setae long, sparse. Anal pores (of terminal segment) absent. TERGITES: First pedal and ultimate pedal yellow, those remaining yellowish-white; bisulcate; very sparsely clothed with rather long setae; ultimate pedal pretergite laterally undivided, fused with its pleurites. PLEURAL REGION: (fig. 12). Series 4 alpha and beta absent; series 5 absent (suppl. note 5).

SUPPLEMENTARY NOTES

1. MANDIBLE. The cleft in the dentate lamella is sufficiently obscure to be overlooked easily, and in fact it may even be an artifact, as may be its counterparts in a number of the cases noted in the literature. Though the question of whether or not a given schendylid dentate lamella is divided or not seems important, in my opinion (and at this time) the significance for systematics of the number and kind of divisions has yet to be demonstrated.

2. 1ST MAXILLARY LAPPETS. Attems (in Das Tierreich, Lief. 52, p. 87, 1929) describes the known members of *Nyctun-*

guis as lacking 1st maxillary lappets, possibly because (1) he had never directly studied a specimen, or (2) they had never been ascribed to any species in the literature, or (3) perhaps because Verhoeff's figure of the maxillae of *N. dampfi* suggests them to be absent. In addition to *pholeter,* I have examined several Californian congeners and have found well-developed, though frequently concealed, lappets in all cases.

3. Sensilla Basiconica of the Ungula. Microscopic examination of the claws of the prehensors and 1st maxillae discloses the presence of numerous minute canals extending through the exoskeleton and connecting the body surface with its interior. Having observed them in all of the chilopod orders, I was at a loss to imagine their function, unless they were glandular canals of some sort. However, S. L. Tuxen of Denmark seems indirectly to have explained their presence correctly. In the course of his study of similar canals in the chelicerae of a solpugid, he observed that each is capped by a minute hyaline cone and therefore suggested that they are sensory in nature and probably chemoreceptors. Subsequently I found the same hyaline cones in centipedes. These structures then are probably the modified counterparts of the sensilla basiconica of insects.

4. Pretarsal Accessory Spines. I have found the same remarkably large pretarsal accessory spines in several Pacific coast members of the genus, though in these they are more prominent than in *pholeter,* being darker and heavier. I have observed such *conspicuous* accessory spines in no other Geophilomorpha, nor have I read of them in connection with any other species, with the possible exception of the Neogeophilidae. Their presence, especially in a schendylid, may actually be quite meaningful, since they may be homologous with the pretarsal accessory (articulated) *spurs* of the more primitive orders, e.g., Lithobiomorpha and Scolopendromorpha. If this is so, then they represent still another primitive feature testifying to the evolutionary conservatism of the Schendylidae within the Geophilomorpha.

5. The Pleural Region. The system of pleurite nomenclature used here is that of Broelemann. It is explained in

Faune de France, 25: 45, 1930; examples of its use may be found in Broelemann and Ribaut, Nouv. Arch. Hist. Nat., Paris (5) 4: 53–183, 1912. In addition to one other work by a different author, their "Essai d'une Monographie des Schendylina" in my opinion still stands as one of the two most detailed, orderly, best illustrated, and in some ways most searching preliminary analysis ever accorded a group of centipedes during the hectic history of their study.

Slide Preparation with Hoyer's Mountant

It has been my experience that treating the delicate mouthparts in weak KOH or even in the gentler NaOH too often results in the distortion or partial (or complete) destruction of certain critical structures such as the labral teeth and fimbriae, parts of the maxillae, and the prehensorial ungula. This prob-

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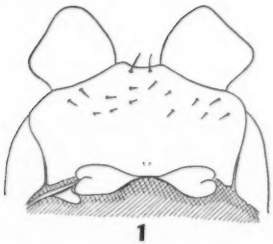
Explanation of Figures

1. Clypeus. Labrum schematic; all clypeal setae shown.
2. Prosternum. (Ventral, left half.) Anterior diastema with thickenings shown in inset. A, areas of prominent reticulation, weakly sclerotized. B, thickened edge of prosternal suture.
3. 2nd maxillary claw. (Left.)
4. 1st maxillae. (Left half.) A, lappet of telopodite. B, concealed lappet of coxosternum.
5. Left prehensor. (Ventral.) Poison canal and calyx outlined in dashes; larger setae shown.
6. Poison calyx of left prehensor.
7. 1st and 2nd maxillae. (Left half.) Prominent reticulation of bridge-piece shown in inset; larger setae included.
8. Labrum. A, medial arc. B, right lateral piece. C, typical strong, distinct reticulation of lower clypeus. D, weakly sclerotized, weakly reticulate upper portion of labrum. E, heavily sclerotized, non-reticulate corner of labrum; fulcrum shown in dashes.
9. Pretarsal claw of right first leg.
10. Ultimate pedal and succeeding segments. (Ventral.) Prominent setae of left half shown.
11. Representative labral teeth. A, from medial arc. B, from lateral piece.
12. Left eupleurium of 5th pedal segment. The more prominent setae shown. Tgt., tergite; Stn., sternite.
13. Mandible. A, row of simple hyaline teeth. B, dentate lamella of ten teeth, two broken.
14. Fifth sternite. A, paxillus of metasternite. B, weakly defined right lateral pore-field. C, prominent medial pore-field. The more prominent setae shown.



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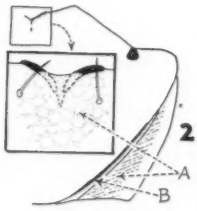

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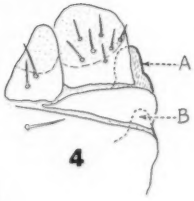

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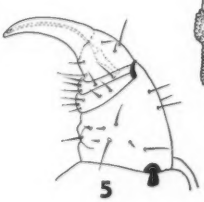

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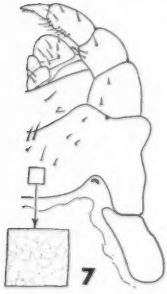

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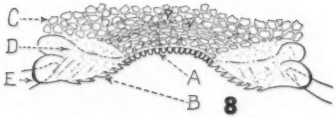

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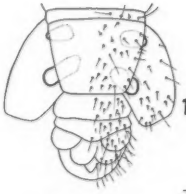

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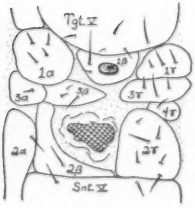

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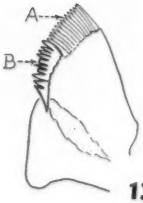

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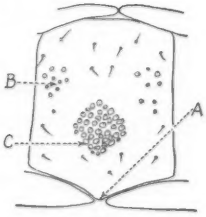

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lem may usually be resolved through the use of Hoyer's mounting medium, a semi-permanent (though possibly permanent) mountant that is gaining an increasing following among zoologists.

It offers a number of desirable advantages apart from its ability to preserve and clear without distortion or destruction. Parts may be transferred to it directly from alcohol, water, or glycerine without preliminary treatment. It permeates the specimen rapidly and thoroughly, clearing it beautifully at the same time. It neither discolors with age nor crystallizes. It may be thinned with distilled water repeatedly.

As to procedure, one simply covers the object with the mountant in the usual manner on a microscope slide and then applies a plain or supported cover glass. *Gentle heating for one to two hours* is most desirable as it speeds clearing, insures uniform penetration without the formation of internal bubbles, and hastens hardening of the exposed mountant. To counteract the mountant's chief disadvantage, its tendency to shrink, after a day or so ring the preparation with fresh Hoyer's, and when this has set, ring it once or twice with some standard ringing mixture, such as murrayite.

As to permanency, slides of mites prepared with Hoyer's in this museum twenty years ago remain in perfectly acceptable condition today. The formula is as follows:

distilled water	50 ml.
gum arabic	30 grams
chloral hydrate	200 grams
glycerine	20 grams

The materials go into solution slowly, so that intermittent stirring over a period of several days is often necessary. Mix in the order given.

Mexican Jungle and Desert Fleas with Three new Descriptions

By C. Andresen Hubbard, Tigard 23, Oregon

I have before me at this time the results of two collections of fleas from Mexico. Dr. Murray Johnson, physician and surgeon, and well known west coast mammologist of Tacoma, Washington, collecting 35 miles north of Los Mochis on the border between Sinoloa and Sonora, Mexico on March 23, 1954, removed

Orchopeas s. firemani Hubbard, 4 males and 5 females off *Teanopus phenax* (woodrat), and on March 12–14, 1956 at Alamos, Sonora;

Echidnophaga gallinacea (Westwood), 4 males, 12 females off *Brassariscus astulus* (ringtail cat); off *Didelphis m. mesamericanus* (opossum), 61 males, 353 females;

Pulex simulans Baker, 10 males, 8 females off *Brassariscus austulus;* 31 males, 35 females off *Didelphis m. mesamericanus* and off *Citellus g. rupestis* (ground squirrel), 10 males, 12 females;

Ctenocephalides f. felis (Bouche), 1 male and 2 females off *Didelphis m. mesamericanus.*

It is to be noted in the above that for the first time in over 50 years the determination of *Pulex simulans* Baker has been used. Mr. Frans Smit of the British Museum, who studied the fleas involved, thinks he has found the characteristics upon which Baker made the original description in 1895. Practically all investigators to date have considered *P. simulans* a synonym of *P. irritans.* Smit is quite serious in his contention that *P. simulans* is a good species and has determined *Pulex* from central California for the writer as *P. simulans.*

The second collection before me was made by Mr. C. Hayden formerly of Riverdale, California but whose present whereabouts is unknown to the writer. During December of 1955 and January and February of 1956 Mr. Hayden was collecting about Mexico City. Six areas were visited, 14 different hosts ex-

amined, and the 24 vials of fleas collected represented 16 species and subspecies, 3 of which are considered new and described herewith as such. Upon the arrival of the materials the writer examined same without clearing and noticed the bulk of the fleas were of the genera *Kohlsia, Jellisonia, Pleochatis* and *Polygenis.* These genera being unfamiliar to the writer, the entire collection was forwarded to the British Museum for consideration. The results, now indexed, are as follows:

Pulex irritans L. off *Urocyon cinereoargenteus* (fox), 2 males, Pueblo Nuevo, Chiapas, Feb. 6, 1956.

Ctenocephalides canis (Curtis) off *Urocyon cinereoargenteus,* 3 pairs, Pueblo Nuevo, Chiapas, Feb. 6, 1956.

Ctenodephalides f. felis (Bouche) off *Nasua narica* (koati), 4 males, 8 females, San Luis Potosi, Dec. 19, 1955; off *Sylvilagus floridanus* (cottontail), 2 females, Desierto de los Leones, Mexico City, Jan. 8, 1956.

Kohlsia cora Traub out of mouse nest, 7 males, 12 females, Pueblo Nuevo, Chiapas, Feb. 11, 1956.

Kohlsia whartoni T. and J. off *Peromyscus boylii* (deer mouse), 2 pairs, Pueblo Nuevo, Chiapas, Feb. 6, 1956; off *Neotoma mexicana* (woodrat), 1 male, Pueblo Nuevo, Chiapas, Feb. 9, 1956.

Kohlsia linni new species

There are before the writer at this time the *holotype* male, off *Peromyscus boylii* (deer mouse) (type host), Feb. 9, 1956; the *allotype* female and 2 male and 3 female *paratypes* off *Neotoma mexicana* (wood rat), Feb. 9, 1956; all taken at Pueblo Nuevo, Chiapas.

The new species differs from others of the genus in the shape and armature of the

Modified Segments: Male. Finger F, for the lack of better words to describe its shape, might be said to be bulbous or boxing glove like. The anterior border is slightly concave, and the complete apical border rounds nicely from its meeting with the anterior border to its junction with the process. On this face are three major bristles situated about equidistant along the

upper three fourths of the border. A small bristle is located at the most apical point. The finger does not quite reach the apex of the process. The process P is squarish at its apical angle, the posterior face being almost perpendicular. The bristle at the lower corner of P is giant and very long, extending well beyond those on F. Sternite IX with lower apical angle squarish, the apical face bearing 4 short stout bristles, then with upper apical rounded and thumblike, and armed with 3 short, almost spiniforms.

Female. Sternite VII with 2 lobes, the valley between larger or smaller, depending on variation, the upper lobe a small triangular protruberance, usually extending beyond the lower lobe which may be anywhere from rounded to block-like and squarish.

This flea bears the name of Dr. Otto Linn, Dean Emeritus of Faculty, Pacific Bible College, Portland, Oregon, under whom the writer has now been teaching for ten years.

Pleochaetis schmidti Traub off *Neotoma mexicana* (woodrat), 1 pair, 1956, Pueblo Nuevo, Chiapas, Feb. 9, 1956.

Pleochaetis mathesoni Traub off *Neotoma mexicana,* 1 male, Pueblo Nuevo, Chiapas, Feb. 9, 1956.

Jellisonia ironsi Eads off *Baiomys musculus* (pigmy mouse), 1 female, Comitan, near Rio Grihalva, Chiapas, Feb. 15, 1956.

Jellisonia grayi new species

There are before the writer at this time, all from El Salto, San Luis Potosi, the *holotype* male, off *Peromyscus boylii* (deer mouse) (type host), Dec. 15, 1955, the *allotype* female and 2 male and 1 female *paratypes* with same data, and 1 male *paratype* off *Peromyscus boylii,* Dec. 18, 1955; and off *Sigmodon hispidus* (cotton rat), 1 male *paratype,* Dec. 18, 1955.

The new species differs from others in the genus in the shape and armature of the

Modified Segments: Male. The finger F might be called triangular, the posterior face made undulant by the insertion of the 5 major bristles. The heel is well defined, and at this ventral apical angle there is inserted a very large bristle. Along the posterior border, about equally spaced, are 4 other promi-

nent bristles which, due to their deep insertions, make the posterior border look undulant. Process P is somewhat hook shaped, the hook facing anteriorly.

Female. Sternite VII consists of a squarish lobe below, then a deep valley, then a second lobe, pointed, triangular, and as long as the first.

This flea bears the name of Dr. Albert Gray, President Emeritus of Pacific Bible College, Portland, Oregon.

Foxella ignota chapmani new subspecies

There is before the writer at this time only the *holotype* male which was taken off a cotton rat (*Sigmodon hispidus*) at El Salto, San Luis Potosi, on December 15, 1955. Although the holotype was taken off a cotton rat, it seems likely that this was accidental for *Foxella* usually have pocket gophers for their normal hosts. The new subspecies differs from others in the series mainly in the proportions of the VIIIth sternite in the male. Due to the fact that this is short in the new subspecies it seems likely that it is close to *Foxella ignota franciscana.*

Modified Segments: Male. Finger F long, slender and finger like; armed along its posterior border with the usual equally spaced 3 major bristles. Process P, the characteristic long, slender, high process, armed at the apex by a few minute bristles. VIIIth sternite characteristic, the apex with the usual long, undulant bristle and above it a wide area, squarish, the area of which is greater than any *Foxella ignota* so far described.

The female is unknown to the writer.

This flea bears the name of Dr. Milo Chapman, President of Pacific Bible College, Portland, Oregon.

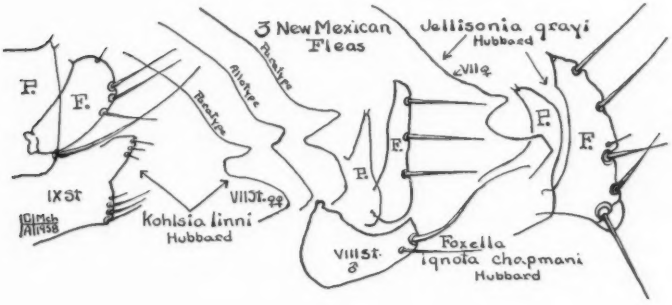
Orchopeas howardi bolivari Barrera off *Urocyon cinereoargenteus* (fox), 1 female, Pueblo Nuevo, Chiapas, Feb. 6, 1956; off *Sciurus aureogaster* (squirrel), 3 males, 1 female, Pueblo Nuevo, Chiapas, Feb. 5, 1956.

Opisodasys robustus mexicanus Dampf off *Sciurus nelsoni* (squirrel), 2 males, 12 females, Desierto de los Leones, Mexico City, Jan. 1, 1956.

Polygenis vazquezi Vargas off *Peromyscus boylii* (deer mouse), 1 male, 8 miles south of Vera Cruz, Oaxaca, Jan. 23, 1956; off *Liomys pictus* (pocket mouse), 3 males, 2 females, 2 miles west of Tapanatepec, Oaxaca, Jan. 29, 1956; off *Didelphis marsupialis* (opossum), 1 pair, Comitan, near Rio Grihalva, Chiapas, Feb. 15, 1956.

Rhopalopsyllus cacius saevus J. and R. off *Homo sapiens* (man), 1 female, Comitan, near Rio Grihalva, Chiapas, Feb. 12, 1956.

Rhopalopsyllus australis australis Rothschild off *Procyon lotor* (raccoon), 1 female, Desierto de los Leones, Mexico City, Jan. 8, 1956; off *Didelphis marsupialis* (opossum), 1 male, 2 females, Desierto de los Leones, Mexico City, Jan. 8, 1956.



Note: Since the writer no longer possesses a collection of fleas, his collection for the most part having been transferred to the Rothschild collection by gift, all materials mentioned above are returned to the Rothschild collection, and any information wished concerning them should be addressed to Mr. Frans Smit, Custodian of the Rothschild Collection of Siphonaptera, Zoological Museum, Tring, Herts., England.

The 3 new descriptions herewith bring to 60 the number of world fleas described by the writer, 50 from the continental

United States, 6 from Iraq and 4 from Mexico, and clear his desk once again of siphonapteran materials.

The writer has asked Mr. Smit to send to the United States National Museum and the Academy of Natural Sciences of Philadelphia paratypes where they are available.

Pison (Paraceramius) koreense (Rad.), A New Adventive Wasp in Eastern United States (Hymenoptera, Sphecidae)

By Karl V. Krombein, Entomology Research Division, Agr. Res. Serv., U. S. D. A.

For several years I have puzzled over the specific identity of a short series of *Pison* (5.5–6.5 mm. long), reared by A. D. Cushman, July 19, 1954, from some fragile clay cells. He found this aggregation of cells inside a discarded photographic tank stored under an old Army barracks. This building had been transported to McLean, Virginia, from Georgia after the war. More recently J. T. Medler sent a single specimen reared in 1957 from a similar cell found at Palisades Park, Illinois. At first I supposed that the wasp was *Pison laeve* Smith, described from Georgia, but I. H. H. Yarrow at the British Museum advised me that Smith's species belongs to a different subgenus. Subsequent study of the collection in the U. S. National Museum indicated that this unknown species was more closely allied to those occurring in eastern Asia and the Orient than it was to any of the South American species. Suspecting by now that it might be *koreense* (Rad.), I borrowed a Japanese specimen of that species from K. Yasumatsu, and was able to confirm this tentative determination.

P. koreense is native to Korea, China and Japan, and is now established at two localities in the United States. Presumably it was introduced here since the war, possibly on military materiel returned to this country (Palisades Park is near the Ordnance Depot at Savannah, Ill.). Probably it can be expected

to turn up at additional localities as it extends its range or as additional successful introductions are discovered.

The reniform eyes covered with dense short hair and two submarginal cells will distinguish *koreense* from any of our native sphecoid wasps. It stores spiders in delicate clay cells about 8 mm. long and 4 mm. in diameter. The cells found by A. D. Cushman were constructed side by side in a diagonal row. The cocoon is opaque, rather brittle, cylindrical with rounded ends, and about 7 mm. long and 2.5 mm. in diameter.

Radoszkowski (1887) included only *koreense* in his new genus *Paraceramius*. I do not accept Turner's synonymy (Proc. Zool. Soc. London, p. 617, 1916) of *Paraceramius* Rad. under *Pison* subgenus *Pisonoides* Sm. In the latter group the eyes are bare, the second recurrent vein is received well within the second submarginal cell (interstitial with the first transverse cubital vein in *Paraceramius*), and the mesopleuron is not margined posteriorly by an oblique row of small foveolae. The other identified species before me belonging to the subgenus *Paraceramius* are the Philippine *Pison browni* (Ashm.) and *P. differens* Turner from Java (type locality is Assam). Two unidentified Neotropical species also belong in *Paraceramius*, though probably in a separate species group because they have three submarginal cells.

EXCHANGES

This column is intended only for wants and exchanges, not for advertisements of goods for sale or services rendered. Notices not exceeding three lines free to subscribers.

These notices are continued as long as our limited space will allow; the new ones are added at the end of the column, and, only when necessary those at the top (being longest in) are discontinued.

Conopidae of the World wanted. Will pay 10¢ to $1.00 for pinned and labelled specimens. S. Camras, 4407 N. Milwaukee Ave., Chicago 30, Illinois.

Anisoptera—Nearctic sp. wanted for exchange, espec. Ophiog., Arigom., Aeschna, Neurocor., Somatoc., Cordulia, Dorocor., Leucor. R. D. Cuyler, Dept. of Entomology, N. C. State College, Raleign, N. C.

Bembicini and Stizini (Hym., Sphec.) of New World wanted for revis. study. Will return upon request or at end of project. James E. Gillaspy, Dept. of Zoology, Univ. Texas, Austin 12, Texas.

Agapema galbina. Will exchange cocoons of this moth for nature books. E. Frizzell, Route 4, Box 96, San Benito, Texas.

Tenebrionidae of the World wanted, in exchange for insects of Argentina and neighboring countries. Horacio J. Molinari, Av. Lib. Gral. San Martin 55, Acassuso (Buenos Aires), Rep. Argentina.

Butterflies. Wish to exchange specimens for Japanese species. Please write to Ichiro Nakamura (Boy, age 16), 26 Aza-Nishiyama Obayashi Takarazuka-shi, Hyogo-Ken, Japan.

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